at 615 Georgia Ave. in Palo Alto.

The most immediate requirement at the time for the new venture was to build test equipment, since none was available. For that matter, diffusion furnaces and bonding equipment were in no great supply. "There was no such thing as an instrumentation marketplace in those days," says Siegel. "If you wanted something, you sat down and started drawing it. Someone would look over your shoulder, make a suggestion, and you'd try it. It was that simple—and that complicated. There were no standards to go by."

So the group devised standards. A wooden work bench that is still used uniformly throughout Silicon Valley was designed by Grinich and Siegel in the Georgia Ave. garage. "We had no idea how high it should be," Siegel relates, "so one day in my motel room (I still hadn't bought a house yet) Vic and I took telephone books and stacked them on a table while we stood next to it. When the telephone books hit our midsections—we're both about the same height—we decided that was the height of the table we'd want. That ridiculous bench is an industry standard today."

In another instance, the organization bought one of the first curve tracers manufactured by Tektronix and developed a close relationship with that company's field engineer. The tracer was sent back to Tektronix with recommendations for improving it, and consequently much of the innovations Tektronix applied to its curve tracers had their origins in the fledgling operation's garage-applications lab.

No Electricity

When the group first moved into the Charleston Rd. facility, the building was still under construction; the walls were in, but it had no electricity. "We would work until dark," says Siegel. "As the days got shorter, so did our work hours. Outside, however, there was a construction line pole with power that we attached wires to so we could at least do sawing and such. I remember seeing Vic Grinich out there that fall with gloves on, a muffler, a hat and his pipe, with a heater nearby plugged into the line."

Electricity or no, the nine upstarts still managed to convince Fairchild Camera and Instrument of the propitiousness of developing the mesa transistor using silicon instead of germanium, and they proceeded with FC&I's financial blessing. It might seem extraordinary that a company of that magnitude and respectability should have decided to back a group of men all under 30 who appeared to have little more than a conceptual idea that they wanted to reduce to practice. The common explanation is that at the time FC&I had no other growth areas left to it and didn't know where else to go with its money.

This is how the garage that 21 years ago housed the beginnings of Fairchild Semiconductor looks today at 615 Georgia Ave., Palo Alto.

Fairchild's Foresight

Also, Sherman Fairchild must have realized that electronics would one day revolutionize the American lifestyle and that semiconductors would revolutionize electronics. The possibilities were probably irresistible to a man who had already successfully exploited numerous other marketplaces. Considering that at least as early as 1966 Fairchild Semiconductor was the largest and most profitable of FC&I's 13 divisions, it was undoubtedly the wisest decision the parent company ever made.

But by November, 1957, what was now Fairchild Semiconductor Co., subsidiary of FC&I, still had plenty of hurdles left to clear before its success story could begin. Hiring was a tremendous problem in that the organization had to set up some sort of testing procedure for prospective employees, and no one had ever taken a course in semiconductors. Most of its first production workers were literally graduate students out of Stanford University. Employers and employees alike, many with backgrounds in vacuum tubes, simply set about reeducating themselves.

The payoff came as early as January, 1958, when IBM placed its first order for 100 silicon transistors based on the mesa process. That order was certainly cause for celebration, but once the group collectively got its feet back down on the ground again, it did so with a resounding thud. The task ahead was monumental.

Siegel recalls that deliveries on the order weren't made until at least May. "We had gotten all our equipment into place," he says, "but those transistors probably came off about three wafer runs. FC&I had invested about a million and a half dollars for us to produce 60 wafers to make 100 workable devices, and they cost approximately $200 each. One of them would sell for 3¢ to 6¢ today."

Siegel adds that while IBM was somewhat impatient to receive its deliveries, the company exerted little pressure on the semiconductor operation.

"IBM knew that the mesa process, which had been patented by Bell Labs, was up to that time still little more than a laboratory curiosity," he explains, "and it was ecstatic at the prospect that it might be able to get operating transistors based on the concept—at whatever price."

Tom Bay, who had come on board in November and assumed the position of marketing manager, recalls that a big decision regarding those devices was whether to make them npn or pnp.

"Two teams were set up," he says, "with Gordon Moore heading the npn effort and Jean Hoerni the pnp. The npn types won for various reasons, primarily because in those days we were more successful in producing reasonable yields with them."

These early devices were designated the 2N696 and 2N697. The next generation were higher voltage versions, followed by smaller area